

No. XI.—Existed in northern California on the 21st, and moved northward during the 22d; it was accompanied by light rain in this section.

No. XII appeared in Dakota on the 26th; at Fargo a tornado occurred, accompanied by heavy rain and large hail from NW. to SE, width one mile, length 30 miles; barometer fell $\frac{1}{4}$ inch in ten minutes preceding passage; seven houses blown down, five horses killed and north window panes broken, railroad cars heavily loaded, overturned. 27th, moved southeastward to Wisconsin, accompanied by light thunder-showers; 28th, thence to the Ohio valley, and during the 29th and 30th, southward to the Gulf of Mexico, accompanied by generally rainy weather.

Nos. XIII and XIV probably existed in Manitoba on the 30th and 31st, respectively.

No. XV developed in the Lower Ohio valley on the 30th, and moved northward to Michigan during the 31st, accompanied by generally rainy weather.

INTERNATIONAL METEOROLOGY.

March.—Ship "Garelock" left Calcutta March 1st, passed Cape of Good Hope March 17th; reports March 11th heavy gale from W. and WNW., lasting two days, with terrific squalls; ship hove to 57 hours.

April 3rd.—Bark "Kedar" wrecked in hurricane off Cook's Islands, South Pacific ocean.

May.—The "Argomene," from San Francisco to Liverpool, passed Cape Horn May 11th, and reports, "had southerly gale May 13th, 14th and 15th, with heavy snow squalls."

Bark "Pym" passed Sandy Hook at 3:30 p. m. March 25th, and arrived at Anjer, Java, July 1st reports "March 28th, heavy gales and high seas; May 8th, heavy gales and squalls; 9th, seas carried away cargo, derrick and everything movable on deck; hurricane increasing; bar. 29.40; 19th, 0.15 p. m., lat. $36^{\circ} 18' S.$, lon. $10^{\circ} 40' E.$; 20th, high seas; 22d, heavy squall; June 2d, heavy gale and high seas; 10th, hard gale and squally; 11th, 4.09 a. m., increasing gale, with terrific squalls; wind veered suddenly to NW; barometer 29.40; 29th, hard squalls, terrific thunder and lightning.

July 4th.—U. S. Naval Hospital, Yokohama, during morning, strong SW. gale, with squalls and rain, 12th, off Rio Grande del Norte, Brazil, heavy squall. Ship "Garelock," on July 3rd in latitude $23^{\circ} N.$, longitude $58^{\circ} W.$, thence to Bermuda, July 13th, reports variable winds, squalls and frequent waterspouts during these days. 16th, Port Elizabeth, Cape Colony, South Africa, SE. gale. 21st, during a gale, a dory, containing part of crew of schooner "Rich," was blown away from vessel and picked up July 25th in latitude $47^{\circ} 11' N.$, $50^{\circ} 02' W.$ Bark "Clifton," on July 21st, in latitude $37^{\circ} 52' N.$, longitude $58^{\circ} 46' W.$, reports, July 22nd, "heavy gale from WSW., lasting 36 hours." Bark "Osage" reports "heavy squall to the westward of Cape Race." 23rd, $54^{\circ} 41' N.$, $25^{\circ} 22' W.$, W. and NW. squally. 28th, $49^{\circ} 30' N.$, $15^{\circ} 15' W.$, NW. to SW. moderate gale, squally, high beam sea, ship rolling heavily and shipping water over all; $41^{\circ} 10' N.$, $49^{\circ} W.$, heavy southerly gale. 29th, $48^{\circ} 51' N.$, $22^{\circ} 02' W.$, NNE. moderate gale and cloudy; $49^{\circ} 51' N.$, $18^{\circ} 33' W.$, NW. wind, high sea. 30th, Batabano, Cuba, heavy NE. storm during night; nine vessels lost—six ashore; vessel also ashore at Cayo Buva, near Cardenas. 31st, $47^{\circ} 43' N.$, $31^{\circ} 23' W.$, rain squalls.

August.—~~3rd~~ $49^{\circ} 30' N.$, $34^{\circ} 53' W.$, NW, strong breeze and swell, fog and rain; $50^{\circ} 30' N.$, $33^{\circ} 15' W.$, squally; $43^{\circ} 50' N.$, $54^{\circ} 42' W.$, high sea; $6^{\circ} N.$, $30^{\circ} 30' W.$, heavy squall, "carried away all spars by the deck." 5th, $45^{\circ} 46' N.$, $50^{\circ} 32' W.$, NW. thunder-storm. 6th, off Pernambuco, Brazil, gale. 8th, Point a Pitre, Guadeloupe, 2 a. m., barometer 29.77, high wind, squalls and rain; $35^{\circ} N.$, $54^{\circ} 30' W.$, bad weather, SW. winds, squalls and high seas until afternoon of the 11th; $44^{\circ} 27' N.$, $54^{\circ} 48' W.$, heavy W. sea all day. 9th, $42^{\circ} 22' N.$, $60^{\circ} 49' W.$, heavy SW. sea during latter part of day; $47^{\circ} 56' N.$, $50^{\circ} 14' W.$, stiff SW. gale during afternoon; $49^{\circ} 26' N.$, $21^{\circ} 06' W.$, variable wind, heavy rain. 10th, Point a Pitre, Guadeloupe, during last few days threatening weather, much rain and thunder; $45^{\circ} 33' N.$, $55^{\circ} 21' W.$, fresh gales from SW. and W., heavy sea; $51^{\circ} 22' N.$, $15^{\circ} 47' W.$, NNW. squally. 11th, $50^{\circ} 51' N.$, $24^{\circ} 08' W.$, squally and cloudy. 12th, Calcutta dispatch: "recent heavy rains have caused destructive floods throughout India, doing much damage in Scinde, Patna, &c.," $49^{\circ} 44' N.$, $33^{\circ} 25' W.$, light rain; $46^{\circ} 04' N.$, $46^{\circ} 58' W.$, WNW. squally, high W. sea; $49^{\circ} 01' N.$, $34^{\circ} 03' W.$, WNW. strong breeze, heavy rain; $52^{\circ} 52' N.$, $31^{\circ} 30' W.$, heavy sea. 13th, $51^{\circ} 07' N.$, $36^{\circ} 47' W.$, strong NW. gale, heavy sea; $29^{\circ} 08' N.$, $23^{\circ} 49' W.$, high sea. 14th, $49^{\circ} 11' N.$, $41^{\circ} 48' W.$, strong NNW. gale, heavy sea; $48^{\circ} 01' N.$, $30^{\circ} 31' W.$, W. moderate storm; $49^{\circ} 18' N.$, $29^{\circ} 24' W.$, WNW. fresh gale, cloudy; $49^{\circ} 27' N.$, $29^{\circ} 04' W.$, W. fresh gale, squally, high sea; $50^{\circ} 30' N.$, $29^{\circ} 26' W.$, W. fresh gale, very heavy W. sea; $49^{\circ} 54' N.$, $5^{\circ} 0' W.$, SW. to W. fresh gale, rough sea. 15th, $47^{\circ} 30' N.$, $36^{\circ} 10' W.$, confused sea; $50^{\circ} 02' N.$, $12^{\circ} 32' W.$, WNW. high sea, stormy. 16th, $51^{\circ} 07' N.$, $24^{\circ} 42' W.$, N. squally, rain; $50^{\circ} 10' N.$, $20^{\circ} 44' W.$, heavy westerly swell. 17th, $38^{\circ} N.$, $73^{\circ} W.$, hurricane from SE., backing to NE. and NW., high seas; $50^{\circ} 15' N.$, $32^{\circ} 30' W.$, high sea. 18th, $48^{\circ} 32' N.$, $39^{\circ} 51' W.$, N. moderate gale, high sea; $49^{\circ} 50' N.$, $8^{\circ} 30' W.$, high W. sea swell. 19th, $47^{\circ} 38' N.$, $37^{\circ} 40' W.$, fresh northerly gale; $49^{\circ} 45' N.$, $16^{\circ} 41' W.$, increasing SW. winds. 20th, $42^{\circ} N.$, $62^{\circ} W.$, hard W. gale, of short duration; $44^{\circ} 27' N.$, $54^{\circ} 54' W.$, confused sea; $48^{\circ} 34' N.$, $38^{\circ} 42' W.$, fresh northwesterly gale, squalls and rain; $50^{\circ} 10' N.$, 31° to $34^{\circ} W.$, hurricane veering from S. by W. to N. by W. 51° 46' N., 24° 44' W., W. to S. squally, high W. sea; 49° 12' N., 23° 10' W. stormy, very high sea. 21st, 48° 03' N., 29° 21' W., W. stormy, very high sea. 22nd, 51° 14' N., 15° 50' W., fresh SE. squally; 50° 25' N.,

16° 22' W., at night, SE. breeze, stormy. 25th, 53° 24' N., 25° 36' W., a. m., strong WSW. breeze, heavy rain squalls; noon, moderate westerly gale, cloudy; p. m., stormy N. breeze. 26th, 50° 40' N., 32° 35' W., fresh W. to N. gale; 51° 58' N., 32° 50' W., a. m., hard northerly gale and tremendous sea. 27th, 51° 50' N., 25° 26' W., strong N. breeze, squally. 29th, 49° 31' N., 42° 40' W., SE. to N. strong breeze, rainy. 30th, 46° 57' N., 50° 16' W., S. rain and fog.

Abstracts from log of schooner "San Diego," beached at Wolf Island, Behring Sea, during winter; observations were commenced October 20th, 1877, and continued until April 30th, 1878, at 7 a. m., noon, and 6 p. m. *October* 20th to 31st, mean daily barometer, lowest, 28.70; highest, 29.55; mean daily temperature, lowest, 28°; highest, 44°; N'y hail squalls, 23d and 24th; NE. gales, 20th and 21st. *November*, m. d. bar., lowest, 28.20; highest, 29.60; m. d. temp., lowest, 22°; highest, 40°; snow on 9 days; rain, 4 days; hail, 1 day; gales on 10 days. *December*, m. d. bar., lowest, 28.20; highest, 29.80; minimum reported temp., 2°; maximum daily mean temp., 37°; snow, 9 days; hail, 1 day; gales on 11 days. *January*, m. d. bar., lowest, 28.10; highest, 29.50; min. temp., 2°; max., 42°; snow, 5 days; rain, 1 day; gales, 5 days. *February*, m. d. bar., lowest, 28.40; highest, 29.50; min. temp., -8°; max., 49°; snow, 4 days; gales, 4 days. *March*, m. d. bar., lowest, 28.50; highest, 29.30; min. temp., 4°; max., 56°; snow, 4 days; gale, 1 day. *April*, m. d. bar., lowest, 28.40; highest, 29.90; min. temp., 18°; max., 52°; snow and rain, 13 days; gales, 7 days.

Monthly reports from York Factory, Hudson's Bay, Canada, contain the following items: *March*, mean barometer, 29.79; max., 30.66; min., 29.50; mean temp., 8° 9'; max., 30°; min., -18° 5'; snow-fall, 17.9 inches in 22 days; the Aurora borealis observed on 12 days, generally very faint; depth of ice in river on the 31st, 5 ft. 8 in. *April*, mean bar., 29.97; max., 30.35; min., 29.01; mean temp., 27° 3'; max., 53° 5'; min., 6° 0'; total rain-fall or melted snow, 0.41 in.; rain on 3 days; snow on 10 days; the Aurora borealis observed on 7 days, generally faint. *May*, mean bar., 29.92; max., 30.33; min., 29.51; mean temp., 32° 8'; max., 75°; min., 10° 5'; total rain and melted snow, 2.21; rain on 9 days; snow on 6 days; Aurora on 3 days; ice in river broke up from the 14th to 16th; 21st, woods on fire. *Zoological*.—*March* 17th, snow-birds; April 22d, geese; 23d, ducks; 25th, snipe; 27th, robins.

Ice at Sea.—Captain Dollard, of schooner "Stag Hound," reports "June 15th north of St. Paul's Island, Behring sea, spoke schooner "Legal Tender," bound for Point Hope, Arctic ocean, which vessel had fallen in with ice, and, finding it impossible to proceed further, was bound across Behring sea to try the Asiatic shore. Captain Dollard also reports "July 3d as far north as King's Island, Behring Straits, found ice very heavy; could not proceed further north."

Ocean current.—The Maritime Sub-delegate of the bay of Coronel, Chili, reports "June 22d, at low tide, a strong current was noted to the northwest of Point Puccho, coast of Chili, which reached three miles an hour in the direction of the bay of Coronel. This extraordinary current was purely accidental, and had its origin in the continued winds from the 4th quadrant, which blew during the month, and in the great discharge from the river Bio Bio, in consequence of heavy rains."

TEMPERATURE OF THE AIR.

The isothermal lines on chart No. II illustrate the general distribution of the temperature of the air, during the month. By a reference to the table, on the left side of same chart, it will be seen that the average for the month has been above the mean in all sections, except in lower Canada, New England and on the Pacific coast; the average for the Gulf States is not obtainable, owing to the monthly reports from the Lower Mississippi valley not having come to hand, but the means of stations, situated elsewhere, show it to be about 2° above normal. Since the chart was printed New Orleans has come to hand, mean temperature, 83° 5' barometer, 29.96.

Maximum and Minimum Temperatures, respectively.—*Maine*—At Orono, 44° and 82°; Cornish, 53, 86. *New Hampshire*—Mt. Washington, 30, 60; Dunbarton, 42, 90. *Vermont*—Woodstock, 41, 87; West Charlotte, 55, 94. *Massachusetts*—Rowe, 42, 80; Somerset, 49, 91. *Rhode Island*—Fort Adams, 58, 80; Newport, 54, 81. *Connecticut*—New London, 52, 84; Southington, 56, 83; New Haven, 52, 86. *New York*—Plattsburg Barracks, 47, 83; Waterburg, 48, 90; Willett's Point, 62, 93; Rochester, 52, 87; Albany, 49, 85; New York city, 59, 88. *New Jersey*—Freehold, 53, 86; Jersey City, 63, 95; Vineland, 57, 92. *Pennsylvania*—Franklin, 40, 84; Tioga, 47, 90; Pittsburgh, 52, 94; Philadelphia, 58, 89. *Delaware*—Dover, 52, 90. *Maryland*—Woodstock, 52, 91; Owing's Mills, 54, 86; New Market, 64, 92. *District of Columbia*—Washington, 57, 93. *Virginia*—Wytheville, 54, 88; Capeville, 70, 98; Cape Henry, 66, 99. *West Virginia*—Morgantown, 56, 90. *North Carolina*—Highlands, 60, 85; Wilmington, 62, 99; Weldon, 64, 100. *South Carolina*—Aiken, 68, 98; Charleston, 69, 97. *Georgia*—Augusta, 69, 105; Forsyth, 75, 100; Tybee Island, 72, 101. *Florida*—Daytona, 63, 97; Fort Barrancas, 68, 103; Key West, 76, 94. *Alabama*—Montgomery, 70, 97; Cress Spring, 70, 98. *Mississippi*—Fayette, 68, 94; Brookhaven, 72, 101. *Louisiana*—New Orleans, 73, 94. *Texas*—Fort Concho, 50, 99; Fort McKavett, 55, 98; Boerne, 65, 104; Terril, 72, 105; Melissa, 74, 107. *Ohio*—Westerville, 46, 88; Cleveland, 52, 89; Cincinnati, 60, 94; Jacksonburg, 62, 96. *Kentucky*—Louisville, 59, 96; Danville, 60, 94. *Tennessee*—Nashville, 63, 97; Austin, 66, 96; Cleveland, 66, 100. *Arkansas*—Mt. Ida, 66, 98; Judsonia, 70, 95. *Michigan*—Grand Haven, 46, 83; Detroit, 45, 90; Alpena, 50, 92. *Indiana*—Indianapolis, 53, 92; New Harmony, 55, 97; Laconia, 58, 99. *Illinois*—Rockford, 53, 87; Chicago, 57, 91; Louisville, 60, 100; Peoria, 58,